Backgrounder

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Nuclear Power Plant Licensing Process

The Nuclear Regulatory Commission (NRC) is responsible for licensing and regulating the operation of commercial nuclear power plants in the United States. Currently operating nuclear power plants have been licensed under a two-step process described in Title 10 of the Code of Federal Regulations (10 CFR) under Part 50. This process requires both a construction permit and an operating license.

In an effort to improve regulatory efficiency and add greater predictability to the process, in 1989 the NRC established alternative licensing processes in 10 CFR Part 52 that included a combined license. This process, although not used to date, combines a construction permit and an operating license with conditions for plant operation.

Other licensing alternatives under Part 52 include Early Site Permits that allow an applicant to obtain approval for a reactor site without specifying the design of the reactor(s) that could be built there, and certified standard plant designs which can be used as pre-approved designs.

In either process (10 CFR Part 50 or Part 52), before a nuclear power plant can be built and operated, approval must be obtained from the NRC. In both licensing processes the NRC maintains oversight of the construction and operation of a facility throughout its lifetime to assure compliance with the Commission's regulations for the protection of public health and safety, the common defense and security, and the environment.

Two-Step Licensing Process (10 CFR Part 50)

All nuclear power plant applications must undergo a safety review, an environmental review and antitrust review by the NRC.

In order to construct or operate a nuclear power plant, an applicant must submit a Safety Analysis Report. This document contains the design information and criteria for the proposed reactor and comprehensive data on the proposed site. It also discusses various hypothetical accident situations and the safety features of the plant that prevent accidents or, if accidents should occur, lessen their effects. In addition, the application must contain a comprehensive assessment of the environmental impact of the proposed plant. A prospective licensee also must submit information for antitrust reviews of the proposed plant.

When an application to construct a nuclear plant is received, the NRC staff determines whether it contains sufficient information to satisfy Commission requirements for a detailed review. If the application is accepted, the NRC holds a public meeting near the proposed site to familiarize the public with the safety and environmental aspects of the proposed application, including the planned location and type of plant, the regulatory process, and the provisions for public participation in the licensing process. Numerous public meetings of this type are held during the course of the reactor licensing process.

All documents and correspondence related to the application are placed in the agency document management system, ADAMS, and in the NRC Public Document Room located in Rockville, Maryland. The NRC issues a press release to media near the proposed plant announcing receipt of the application and sends copies of the announcement to Federal, State, and local officials. In addition, a notice of receipt of the application is published in the *Federal Register.*

The NRC staff then reviews the application to determine whether the plant design meets all applicable regulations (10 CFR Parts 20, 50, 73, and 100). The review includes, in part:

characteristics of the site, including surrounding population, seismology, meteorology, geology and hydrology;
design of the nuclear plant;
anticipated response of the plant to hypothetical accidents;
plant operations including the applicant's technical qualifications to operate the plant;
discharges from the plant into the environment (i.e., radiological effluents); and
emergency plans.

When the NRC completes its review, it prepares a Safety Evaluation Report summarizing the anticipated effect of the proposed facility on public health and safety.

The Advisory Committee on Reactor Safeguards (ACRS), an independent group that provides advice on reactor safety to the five-member Commission, reviews each application to construct or operate a nuclear power plant. The ACRS review begins early in the licensing process, and a series of meetings with the applicant and the NRC staff are held at appropriate times in the review process. When the ACRS has completed its review, it submits the results in a report to the Commission via a letter to the Chairman of the NRC.

An environmental review is performed by the NRC staff in accordance with the National Environmental Policy Act to evaluate the potential environmental impacts and benefits of the proposed plant. After completing this review, the NRC issues a Draft Environmental Impact Statement for comment by the appropriate Federal, State, and local agencies as well as by the public. Afterwards, the agency issues a Final Environmental Impact Statement that addresses all comments received.

The Atomic Energy Act requires that a public hearing be held before a construction permit is issued for a nuclear power plant. The public hearing is conducted by a three-member Atomic Safety and Licensing Board. The board is composed of one lawyer, who acts as chairperson, and two technically qualified persons. Members of the public may submit written or oral statements to the licensing board to be entered into the hearing record or they may petition to intervene as full parties in the hearing.

The NRC may authorize the licensee to do some construction at the site prior to the issuance of a construction permit. This authorization is known as a Limited Work Authorization and is done at the risk of the licensee. This authorization may be granted only after the licensing board has made all of the NEPA findings required by the Commission's regulations for authorizing construction and has determined that there is reasonable assurance that the proposed site is a suitable location, from a radiological health and safety standpoint, for a nuclear power reactor of the general size and type proposed.

After a construction permit is issued, the applicant must, if it did not as part of the original application, submit a Final Safety Analysis Report to support its application for an operating license. This report describes the final design of the facility as well as its operational and emergency procedures. The NRC prepares a Final Safety Evaluation Report for the operating license, and the ACRS makes an independent evaluation and presents its advice to the Commission.

A public hearing is not mandatory or automatic for operating license applications. However, the NRC publishes a notice in the *Federal Register* that it received an application for an operating license, has accepted it for review, and is considering issuance of the license. The notice provides the public an opportunity for those whose interest might be affected by the issuance of the license to request a hearing. If a public hearing is held, the same decision process described for the construction permit hearing applies.

Combined License (10 CFR Part 52)

A combined license authorizes construction of the facility in a manner similar to a construction permit under the two-step process (Part 50). It must contain essentially the same information required in an application for an operating license issued under 10 CFR Part 50 and specify the inspections, tests, and analyses that the applicant must perform. It also specifies acceptance criteria that are necessary to provide reasonable assurance that the facility has been constructed and will be operated in conformity with the license and applicable regulations. If an early site permit and design certification are not referenced, then the NRC reviews the technical and environmental information as described for the two-step licensing process. There is also a mandatory hearing for a combined license.

After issuing a combined license, the Commission authorizes operation of the facility only after verifying that the licensee completed required inspections, tests, and analyses and that acceptance criteria were met. At periodic intervals during construction, the NRC publishes

notices of these completions in the *Federal Register*. Then, not less than 180 days before the date scheduled for initial loading of fuel, the NRC will publish a notice of intended operation of the facility in the *Federal Register*. There is an opportunity for a hearing at this time, but the NRC will consider petitions for a hearing only if the petitioner demonstrates that the licensee has not met or will not meet the acceptance criteria. Before a plant can operate, the Commission must determine that the acceptance criteria have been met.

Early Site Permits

An early site permit resolves site safety, environmental protection, and emergency preparedness issues independent of a specific nuclear plant design. The early site permit application must address the safety and environmental characteristics of the site and evaluate potential physical impediments to developing an acceptable emergency plan. The application contains the following information:

site boundaries;
seismic, meteorologic, hydrolic, and geologic data;
location and description of any industrial, military, or transportation facilities and routes;
existing and projected future population of the surrounding area;
evaluation of alternative sites;
proposed general location of each plant planned to be on the site;
number, type and power level of the plants planned for the site;
maximum discharges from the plant;
type of plant cooling system to be used;
radiation dose consequences of hypothetical accidents; and
plans for coping with emergencies.

The NRC documents its findings on site safety characteristics and emergency planning in a Safety Evaluation Report and on environmental protection issues in Draft and Final Environmental Impact Statements.

The early site permit also allows for a limited work authorization to perform non-safety site preparation activities, subject to redress, in advance of issuance of a combined license. After the NRC staff and the ACRS complete their safety reviews, the NRC issues a Federal Register notice for a mandatory public hearing. The early site permit is initially valid for no less than 10 and no more than 20 years and can be renewed for 10 to 20 years.

Design Certification

The NRC may approve and certify a standard nuclear plant design through a rulemaking, independent of a specific site. The design certification is valid for 15 years. An application for a standard design certification must contain proposed inspections, tests, analyses, and acceptance

criteria (ITAAC) for the standard design. Additionally, the application must demonstrate how the applicant complies with the Commission's relevant regulations.

The safety review of the application is based primarily on the information submitted by the applicant under oath or affirmation. An application must contain a level of design information sufficient to enable the Commission to reach a final conclusion on all safety questions associated with the design. In general terms, a design certification application should provide an essentially complete nuclear plant design, with the exception of site-specific design features such as intake structures and the ultimate heat sink.

The application presents the design basis, the limits on operation, and a safety analysis of structures, systems, and components of the facility as a whole. The scope and contents of the application are equivalent to the level of detail found in a Final Safety Analysis Report for a currently operating plant. The NRC staff prepares a Safety Evaluation Report that describes its review of the plant design and how the design meets applicable regulations.

The ACRS reviews each application for a standard design certification, together with the NRC staff's safety evaluation report, in a public meeting. Upon determining that the application meets the relevant standards and requirements of the Atomic Energy Act and the Commission's regulations, the Commission drafts a rule to issue the standard design certification as an appendix to the 10 CFR Part 52 regulations. Members of the public may submit written or oral comments on the proposed design certification rule. The Commission may hold a hearing at its discretion.

The issues that are resolved in a design certification rulemaking are subject to a more restrictive change process than issues that are resolved under other licensing processes. That is, the NRC cannot modify a certified design unless it finds that the design does not meet the applicable regulations in effect at the time of the design certification, or if it is necessary to modify the design to assure adequate protection of the public health and safety.

An application for a combined license under 10 CFR Part 52 can incorporate by reference a design certification and/or an early site permit. The advantage of this approach is that the issues resolved during the design certification rulemaking and the early site permit hearing processes are precluded from reconsideration later at the combined license stage.

For more information about these licensing processes, go to our website at http://www.nrc.gov/reactors/new-reactor-licensing.html .

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